A REVIEW OF THE INDIAN EULOPHINAE
(HYMENOPTERA: CHALCIDOIDEA: EULOPHIDAE)

DISSERTATION

SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

Master of Philosophy

IN

ZOOLOGY

BY

HUMA AFTAB

DEPARTMENT OF ZOOLOGY
ALIGARH MUSLIM UNIVERSITY
ALIGARH

2005

Phones { External : 2700920
Internal : 3430

DEPARTMENT OF ZOOLOGY
ALIGARH MUSLIM UNIVERSITY
ALIGARH—202002
INDIA

Sections :
1. ENTOMOLOGY
2. FISHERY SCIENCE & AQUACULTURE
3. GENETICS
4. NEMATOLOGY
5. PARASITOLOGY

D. No....../ZD.

Dated 4.6.2005

CERTIFICATE

I certify that the research work leading to the dissertation entitled "**A Review of the Indian Eulophinae (Hymenoptera: Chalcidoidea: Eulophidae)**" was carried out by **Ms. Huma Aftab** under my supervision and guidance. It contains the original research work of the candidate, and will be a distinct addition to our knowledge on the Indian Eulophinae.

I allow **Ms. Huma Aftab** to submit this dissertation to the Aligarh Muslim University, Aligarh, in partial fulfillment of the requirements for the award of the **Degree of Master of Philosophy**.

Dr. Mohammad Hayat
Professor

CHAIRMAN
Department of Zoology
Aligarh Muslim University
ALIGARH

CONTENTS

ACKNOWLEDGEMENTS

I am very grateful to Dr Mohammad Hayat, Professor and Chairman, Department of Zoology, for his guidance and supervision of this research work and for providing the necessary facilities.

I am thankful to Dr (Mrs.) Shoeba Binte Anis, for her help during the preparation of the present dissertation.

I am also thankful to my research colleagues in the Department of Zoology for their help and encouragement.

I am very grateful to my Grandparents, parents, sister, and friends for their constant encouragement and support during my research work.

Huma Aftab

SYNOPSIS

The present dissertation deals eith a Review of the taxonomic status of some Indian Eulophinae (Hymenoptera: Chalcidoidea: Eulophidae).

The subfamily Eulophinae is represented in India by nearly 60 described species, but the taxonomic identities of 31 species are not well known. However, types of only 8 species are available in the collections of the Department of Zoology, A.M.U., Aligarh, and these were examined, and commented upon. The remaining types could not be located in our National Collections.

Based on this study, the author proposes the following new combinations and synonyms: *Euplectrus nararíae* (Kurian), from *Secodes*; *Eurycephaloplectrus natadae* (Kurian), from *Euderus*; *Stenomesius singularis* (Shafee & Rizvi), from *Hemiptarsenus*; *Hemiptarsenus brevipedicellus* Shafee & Rizvi, a new synonym of *H. varicornis* (Girault); *Hemiptarsenus aligarhensis* Shefee & Rizvi, a new synonym of *Notanisomorphella flaviventris* (Girault); *Hemiptarsenus agraensis* Shafee & Rizvi, a new synonym of *Stenomesius japonicus* (Ashmead).

The present study is supported by 23 illustrations.

INTRODUCTION

Chalcidoidea is one of the largest superfamily of the order Hymenoptera. Chalcidoids are found in all zoogeographical regions and in all habitats from equatorial forests to the northernmost tundra, from deserts to ponds. Despite their omnipresence they remain one of the poorest known groups of parasitic Hymenoptera, because of their small size and difficulties encountered in their collection.

Most chalcidoids are parasitoids or hyperparasitoids of the immature stages of insects of 12 orders. Because of their parasitic habits, these insects play a role in keeping insects pest populations under check in their natural habitats, and are extensively used in Classical Biological Control Programmes.

Taxonomic studies on chalcidoids, especially Eulophidae, in India began very late, in the early parts of the twentieth century. Studies on the taxonomy of eulophids, however, gained impetus when their usefulness in controlling abnoxious pest species began to be recognized world-wide, with the result that contributions to the taxonomy of this family increased manifold in the last thirty years. However, compared to the fauna from the other zoogeographical regions of the world, the Oriental, and especially the Indian fauna still remains poorly represented. There are at present only about 60 genera and about 250 species known from India, forming respectively 25 % and 10 % of the world genera and species.

Taxonomic research can be pursued at two levels: one is the descriptions of new taxa which, incidentally, is relatively the most easiest thing to pursue in taxonomy

material of the described species, and to place those species in their correct genera according to the recent generic classification of the group.

The present author chose to pursue the second option mainly because, in the context of the Indian eulophid fauna, the original descriptions, in a majority of the cases, were found to be quite inadequate to recognize the described species. It is to be noted that studies leading to the clarification of the taxonomic positions of the Indian Eulophidae has already began in the Department of Zoology, and recently Hayat & Shahi (2004) published on the taxonomic identities of the Indian Tetrastichinae.

Therefore, the present author has taken-up study of the available types of species of the subfamily Eulophinae. Unfortunately, the location of almost all the types of the earlier described species could not be ascertained with certainty. The enquiries made from the Division of Entomology, I.A.R.I., New Delhi; Forest Research Institute, Dehra Dun; School of Entomology, St.John's College, Agra; and the Zoological Survey of India, Kolkata, have not yielded positive results; these Institutions denied the deposition of types in their collections. The present study is, therefore, restricted largely to the types available in the Department of Zoology, Aligarh Muslim University [ZDAMU], with comments one two species based up on their original descriptions.

The present dissertation is divided into two main Chapters: Chapter 1 deals with my comments on the types (of eight) species of Eulophinae present in the ZDAMU; Chapter 2 presents a preliminary checklist of the Indian species of Eulophinae. Chapter 1 is supported by 23 illustrations. Apart from providing comments on the types, the author has also included additional material of some species available in Hayat collection in the Department of Zoology.

MATERIAL AND METHODS

Material studied :

The present dissertation is concerned with a review of the already described species of the Eulophinae, and as such does not involve descriptions of new species. To this end, he author studied all types of Eulophinae species available in the Department of Zoology, A.M .U., Aligarh.

Methodology :

Type specimens were identified to genus with the help of generic keys to the Eulophidae by Boucek (1988), and Schauff *et al.* (1997).

Drawings of required parts were made with the help of a drawing tube attached to a compound microscope.

Measurements of various slide-mounted parts were taken with the help of an ocular micrometer having a linear scale of 100 divisions placed in the eye-piece of a compound microscope. Measurements from carded specimens were taken with the help of an ocular micrometer (linear scale, 100 divisions) placed in one of the eye- pieces of a stereoscopic binocular microscope.

CHAPTER – 1

On the types of some Indian Eulophinae

1.*Cirrospilus brevicorpus* Shafee & Rizvi

(Figs. 4-5)

Cirrospilus brevicorpus Shafee &.Rizvi, 1988b: 37 – 38, ♀. Holotype ♀ : India, Mathura (ZDAMU).

Type specimen examined: 1 ♀, possibly a paratype, with details as noted under comments.

Comments: The original description of this species was based upon 5 females, holotype and paratypes .

There are no specimens labelled as this species in Shafee's collection. But there are 3 slides containing parts of one female that agrees fairly well with the original description and figures of *brevicorpus*. The slides have reference number '676' crossed out and '692' written on them. But as the specimen was presumably collected by Shafee [It has the name 'S. Adam Shafee' printed on the labels], it may or may not be part of the type material or most probably, a paratype. These slides are now labelled '[?] paratype' of *brevicorpus* in Hayat's handwriting .

The head is damaged and distorted and its colour can not be determined, but the axillae with posterior parts and the gaster with whitish spots are more or less similar to those illustrated for *C. ambiguus* Hansson & LaSalle (1996), and the later species may eventually prove to be a synonymn of *brevicorpus* .

Hosts: Unknown.

Distribution: India: Bihar, Kerala, Uttaranchal, Uttar Pradesh.

Non-type specimens examined: India: Uttar Pradesh, Aligarh, 6 ♀, 23.vi.1984 (M. Hayat and S.S.Islam); 1 ♂, viii.1983 (S.S. Islam); 2 ♀, 26.iii.1978 (M.Verma); 1 ♀, iii.1983 (M. Hayat); 1 ♀, 18.iii.1984 (M. Hayat). Uttaranchal, Dehra Dun,1 ♀, 1978 (M. Verma). Bihar, Gaya, 1 ♀, 4.i.1992 (S.B. Zeya). Kerala, Changaltam, 1 ♀, 26.ii.1993 (S.B. Zeya and S. I. Kazmi).

2. *Cirrospilus kanpurensis* Shafee & Rizvi

(Figs. 6-7)

Cirrospilus kanpurensis Shafee & Rizvi, 1988b: 36, ♀. Holotype ♀: India, Kanpur (ZDAMU).

Type specimen examined: See under comments.

Comments: The original discription of this species was based upon a single specimen, the holotype.

There is no specimen labelled as this species in Shafee's collection. But there is a slide with '0' written with a green glass-marking pencil. It contains one antenna and one fore wing which agree well with the figures of these structures given by Shafee & Rizvi. These are regarded as parts from the holotype, and labelled as such in Hayat's handwriting. The specimen, in spite of a thorough search in Shafee's collection, could not be located, and is probably lost.

Hosts: Unknown .

Distribution: India: Uttar Pradesh.

3. *Elachertus breviclavus* Chishti & Shafee (Figs. 8-11)

Elachertus breviclavus Chishti & Shafee, 1988: 19-20, ♀. Holotype ♀: India, Aligarh (ZDAMU).

Type specimen examined: Holotype ♀, with details as given under comments.

Comments: The original description of this species was based upon a single female specimen, the holotype.

There is no specimen bearing this name in Shafee's collection. But there is a specimen mounted on two slides that agrees fairly well with the original description and figures of the species. One slide has one antenna and a fore wing under a large coverslip, and rest of the body (dissected) is in a drop of balsam on the second slide. These slides bear only refrence number '708'. This specimen is regarded as the holotype and labelled as such in Hayat's handwriting .

Hosts: Unknown.

Distribution: India: Uttar Pradesh.

4. *Euplectrus latifrons* Shafee, Fatma, Khan & Shujauddin

(Figs. 12-14)

Euplectrus latifrons Shafee, Fatma, Khan & Shujauddin, 1984: 618 – 620, ♀.

Holotype ♀: India, Andaman & Nicobar Islands, Port Blair (ZDAMU).

Type specimen examined: Holotype ♀, with details as given under comments.

Comments: The original description of this species was based upon a single female, the holotype.

There is a slide bearing this name and reference number '687B', containing one antenna and a fore wing under a large coverslip. The body was found in alcohol in a vial (along with the body of *Pediobius infuscatipennis*) whose stopper has the number '687'. This specimen is now mounted on a card, and labelled as holotype in Hayat's hand writing. *E . latifrons* is apparently very closely related to *E . atrafacies* Wijesekara & Schauff (1994) .

Hosts: Unknown.

Distribution: India: Andaman & Nicobar Islands.

5. *Euplectrus nararíae* (Kurian), comb. nov.

Secodes nararíae Kurian, 1954: 123-126, ♀. Holotype ♀: India, Appanappalli(?)

Omphale nararíae (Kurian): Husain & Khan, 1986: 227.

Comments: The type depository of this species is not known. This species is transferred to *Euplectrus* on the basis of the original description and especially the long hind tibial spurs illustrated by Kurian (1954). It was transferred to *Omphale* by Husain & Khan (1986) mainly because *nararíae* was described in a genus which is a synonym of *Omphale*.

Host: *Natada nararía*

Distribution: India.

6. *Eurycephaloplectrus natadae* (Kurian), comb. nov.

Euderus natadae Kurian, 1954: 126-128, ♀. Holotype ♀: India, Tatipaka.

Comments: The type depository of this species is not known. This species is transferred to *Eurycephaloplectrus* Wijesekara & Schauff (1997) on the basis of the original description and figures given by Kurian (1954).

Host: *Natada nararía*

Distribution: India.

7. *Hemiptarsenus varicornis* (Girault)

(Figs. 1-3)

Hemiptarsenus brevipedicellus Shafee & Rizvi, 1988a: 14, ♀. Holotype ♀: India, Aligarh (ZDAMU). **SYN. NOV.**

Boucek (1988) should be consulted for further synonyms, and records of this species from India and elsewhere.

Type specimen examined: Probable Holotype ♀, with details as given under comments.

Comments: The original description of this species was based upon a single female, the Holotype.

There is no specimen bearing this name in Shafee's collection. But there is a specimen dissected and mounted on two slides; one slide with one fore wing under a large coverslip; and the dissected parts in a drop of balsam on the second slide. These slides have reference number '677' crossed-out, and number '693' written on them. I have now put a coverslip on these body parts. This specimen agrees well and with the original description, and may be the Holotype. But the slides have the name 'S. Adam Shafee' printed on the lebels, whereas the Holotype of this species was collected by S. Rizvi.

Neither the original description and figures nor the specimen studied show any character to l *bravipedicellus* from *varicornis* and hence the above synonymy.

Hosts: Unknown.

Distribution: India: Widely distributed.

Non-type specimens examined: India: Uttar Pradesh, Aligarh, 5 ♀, 1 ♂, x-xii.1979; 2 ♀, 31.iii.1985; 1 ♀, 11.vii.1984 ; 1 ♂, ix.1992 (all M. Hayat); 1 ♀, .23.ii.1979 (M. Hayat & M. Verma); 1 ♂, vii.1984 (M. Hayat & S.S. Islam); 1 ♀, 16.iii.1978 (M. Verma); 1 ♂, 12.iii.1978 (M. Verma); 1 ♀, 2 ♂, ix-x.1991 (S. B. Zeya). Uttaranchal, Mussoorie, 1 ♀, ii-iv.1978 (M. Verma); Dehra Dun, 3 ♀, 1 ♂, 8.iv.1978 (M. Verma). Pondicherry, 1 ♀, 17-18.ii.1993 (S.B. Zeya & S.I. Kazmi). Andhra Pradesh, Chebrolu, 2 ♀, 12.ii.1993 (S.B. Zeya & S.I. Kazmi).

8. *Notanisomorphella flaviventris* (Girault)

(Figs. 15-17)

Hemiptarsenus aligarhensis Shafee & Rizvi, 1988 a: 15, ♀. Holotype ♀: India, Aligarh (ZDAMU). **SYN. NOV.**

Boucek (1988: 627 – 628, figure 1084) should be consulted for details on this species. He recorded this species from India (Aligarh, Bannerghatta, Coimbatore, Dehra Dun, Mudigere).

Type specimen examined: Holotype ♀, with details as noted under comments.

Comments: The original description of this species was based upon a single female, the holotype.

There is no specimen bearing this name in Shafee's collection. But there are two slides containing a dissected female. The slides have the reference number '696' crossed out, and '698' written in red ink. One slide has one antenna and a fore wing under a large coverslip; rest of the body is dissected and the dissected parts are in a drop of balsam. This specimen agrees fairly well with the original discription and figures, and is regarded as the holotype. The head, thorax and gaster are removed from the slide and mounted on a card. The carded parts and the slides are labelled as holotype of *Hemiptarsenus aligarhensis* in Hayat's handwriting.

The holotype of *H. aligarhensis* agrees well with *Notanisomorphella flaviventris*, and hence the above synonymy.

Hosts: Unknown from India.

Distribution: India: Bihar, Uttar Pradesh, Tamil Nadu, Karnataka, Uttaranchal.

Non-type specimens examined: INDIA: Uttar Pradesh, Aligarh, 2 ♀, 25.vi. 1984 (M. Hayat); 3 ♀, viii.1983 (S.S. Islam); 1 ♀, vii.1984 (M. Hayat & S.S. Islam); 1 ♀,

12.iii.1978; 1 ♀, 7.iv.1978; 1 ♀, 19.viii.1979; 1 ♀, 26.ix.1979 (all M. Verma). Bihar, Gaya, Divizon, 1 ♀, 22.x.1992 (S.B. Zeya).

9. *Stenomesius japonicus* (Ashmead)

(Figs. 18-21)

Hemiptarsenus agraensis Shafee & Rizvi, 1988a: 13, ♀. Holotype ♀: India, Agra (ZDAMU). **SYN. NOV.**

Boucek (1976) should be consulted for details on this species. He has also proposed two other Indian species as synonyms of *japonicus*, namely, *Euryscotolinx coimbatorensis* Rohwer (1921) and *Stenome-sioideus ashmeadi* Subba Rao & Sharma (1966).

Type specimen examined: Holotype ♀, with details as given under comments.

Comments: The original description of this species was based upon a single female, the holotype.

There is no specimen bearing this name in Shafee's collection. But I found a female on a slide in a drop of balsam, with one antenna and a fore wing of this specimen mounted on the same slide under a large coverslip. It is labelled '*Hemiptarsenus* sp. n.' and has reference number '760'. This specimen agrees fairly well with the original description and figures and is taken to be the holotype. It is now labelled as holotype of *Hemiptarsenus agraensis* in Hayat's handwriting.

I find no difference between this species and *Stenomesius japonicus*, hence the above synonymy.

Hosts: *Acrocercops* sp.; *Biloba subsecivella*; *Cyphosticha caerulea*; *Heliothis carinigera*; *Oebia* sp.; *Polithlipta macralis*; indet. leaf-miners.

Distribution: INDIA: Andhra Pradesh, Bihar, Delhi, Karnataka, Orissa, Tamil Nadu, Uttar Pradesh, Uttaranchal, West Bengal.

Non-type specimens examined: INDIA: Uttar Pradesh, Aligarh, 1 ♀, 27.xii.1984 (M. Hayat); 1 ♀, iii.1979 (M. Verma); 1 ♀, iv.1979 (M. Hayat & M. Verma); 1 ♀, 9.xi.1979 (M. Hayat & M.Verma); 1 ♀, vii.1984 (M. Hayat & S.S. Islam). Bihar, Gaya, 2 ♀, 31.xii.1991 (S.B. Zeya); 1 ♀, 4.i.1892 (S.B. Zeya); Gaya, Divizon, 1 ♀, 24.x.1992 (S.B. Zeya); Rampur, Chatkipona; 1 ♀, 1.iii.1994 (S.B. Zeya & S.I. Kazmi). Tamil Nadu, Kodaikanal, 1 ♀, 21.ii.1993 (S.B. Zeya & S.I. Kazmi). Karnataka, Brindawan Gardens, 1 ♀, 7.iii.1993 (S.B. Zeya). Orissa, Puri, Sakigopal, 2 ♀, 2 ♂, 20.ii.1994 (S.B. Zeya); Puri, Balugaon, 1 ♀, 21.ii.1994 (S.B. Zeya). West Bengal, Chandaneswar, 3 ♀, 24.x.1983; 2 ♀, 1.x.1983 (S.S. Islam); Santiniketan, 1 ♀, 15.ii.1984 (S.B. Zeya).

10. *Stenomesius singularis* (Shafee & Rizvi), comb. nov.

(Figs. 22-23)

Hemiptarsenus singularis Shafee & Rizvi, 1988a: 12-13, ♀. Holotype ♀: India, Madhya Pradesh, Sagar, Bina (ZDAMU).

Type specimen examined: Holotype ♀, with details as given under comments.

Comments: The original description of this species was based upon a single female, the holotype.

There is no specimen bearing this name in Shafee's collection. But I found two slides, bearing reference number '707'; one slide with one antenna and a fore wing and the second slide with rest of the body in a drop of balsam. This specimen agrees fairly well with the original description and figures given by Shafee & Rizvi (1988a), and is here regarded as the holotype of *singularis*, and is labelled as such in Hayat's handwriting.

H. singularis belongs to *Stenomesius*, and appears be different from *japonicus* mainly in body colour.

Hosts: Unknown.

Distribution: India, Madhya Pradesh.

CHAPTER – 2

A PRELIMINARY CHECKLIST OF INDIAN EULOPHINAE

Arrangement: The genera and, under each genus, the species are arranged in alphabetical order. For well-known species, instead of the original citations, the most recent citations are given. This is not a catalogue; therefore detailed citations to the genera and species, distribution records and host records are also not given.

I. Genus *Anselmella* Girault

1.*Anselmella kerrichi* (Narayanan *et al.*)

Eugeniana kerrichi Narayanan, Subba Rao & Patel, 1957 : 202, ♀, ♂. India, Pune.

Anselmella kerrichi (Narayanan *et al.*) : Boucek , 1988 : 603.

II. Genus *Anumanniola* Narendran

1.*Anumanniola lasallei* Narendran

Anumanniola lasallei Narendran, in Narendran & Sinu, 2003 : 1032-1033, ♀. India, Karnataka, Sringeri.

III. Genus *Arunus* Singh & Khan

1.*Arunus indicus* Singh & Khan

Arunus indicus Singh & Khan, 1997: 9-11, ♀. India, Pantnagar.

IV. Genus *Cirrospilus* Westwood

1.*Cirrospilus ambiguus* Hansson & LaSalle

Cirrospilus ambiguus Hansson & LaSalle, 1996 : 194-195, ♀, ♂. Tanzania, Also S. Africa, India (Delhi, Aligarh, Gwalior, Chennai).

2.*Cirrospilus brevicorpus* Shafee & Rizvi [See Chapter 1]

3.*Cirrospilus kanpurensis* **Shafee & Rizvi** [See Chapter 1]

4. *Cirrospilus ornatus* **(Mukerjee)**

Euplectrus ornatus Mukerjee, in Saraswat & Mukerjee, 1975: 60, ♂. India, Vanvihar.

Cirrospilus ornatus (Mukerjee): Wijesekara & Schauff, 1994: 34.

5. *Cirrospilus quadristriata* **(Subba Rao & Ramamani)**

Scotolinx quadristriatus Subba Rao & Ramamani, 1965: 412, ♀, ♂. India, New Delhi.

Cirrospilus quadristriata (Subba Rao & Ramamani) : Batra & Sandhu, 1981 : 170-176

6. *Cirrospilus variegatus* **(Masi)**

Cirrospilus variegatus (Masi): Boucek, 1988: 616.

V. Genus *Diglyphus* Walker

1.*Diglyphus funicularis* **Khan**

Diglyphus funicularis Khan, 1985: 152, ♀. India, Nainital, Jaolikot.

2.*Diglyphus guptai* **(Subba Rao)**

Solenotus guptai Subba Rao, 1957: 50-51, ♀, ♂. India, New Delhi.

Diglyphus guptai (Subba Rao): Boucek, 1988: 617.

3.*Diglyphus horticola* **Khan**

Diglyphus horticola Khan, 1985: 150 – 151, ♀. India, Pantnagar.

4. *Diglyphus mandibularis* **Khan**

Diglyphus mandibularis Khan, 1985: 151 – 152, ♀. India, Nainital, Jeolikot.

VI. Genus *Elachertus* Spinola

1.*Elachertus breviclavus* **Chishti & Shafee** [See chapter 1]

2.*Elachertus (Neoelachertus) nexius* **Narendran**

Elachertus (Neoelachertus) nexius Narendran, 2004 : 130-133, ♀. India, Kerala, Kannavaram Forest.

3.*Elachertus (Elachertus) sinui* **Narendran**

Elachertus (Elachertus) sinui Narendran, 2004 : 132-134, ♀. India, Nagarhole.

VII. Genus *Eulophomorpha* Dodd

1.*Eulophomorpha flavicornis* **Dodd**

Eulophomorpha flavicornis Dodd, in Girault : Boucek, 1988 : 630. Recorded from India, Coimbatore.

VIII. Genus *Euplectrophelinus* Girault

1.*Euplectrophelinus saintpierrei* **Girault**

Euplectrophelinus saintpierrei Girault : Boucek, 1988 : 637, Banglore and Patencheru record .

IX. Genus *Euplectrus* Westwood

1. ***Euplectrus bussyi* Crawford**

Euplectrus bussyi Crawford, 1909: 279, ♀, ♂. India, Coimbatore.

2. ***Euplectrus ceylonensis* Howard**

Euplectrus ceylonensis Howard, in Howard & Ashmead, 1896: 641, ♀. Sri Lanka, Pundaluoya.

3.*Euplectrus coimbatorensis* **Ferriere**

Euplectrus coimbatorensis Ferriere, 1941: 33, ♀. India, Coimbatore.

4. ***Euplectrus euplexiae* Rohwer**

Euplectrus euplexiae Rohwer, 1921 : 135, ♀, ♂. India, Coimbatore.

5. ***Euplectrus gopimohani*** **Mani**

Euplectrus gopimohani Mani, 1941 : 33-34, ♀, ♂. Bangladesh, Dacca, Bashbari

6. ***Euplectrus himalayaensis*** **Mani**

Euplectrus himalayaensis Mani, 1935 : 257, ♀. India , Darjeeling.

7. ***Euplectrus indicus*** **Ferriere**

Euplectrus indicus Ferriere, 1941 : 33, ♀. India, Dehra Dun.

8. ***Euplectrus latifrons*** **Shafee *et al.*** [See Chapter 1]

9. ***Euplectrus leucostomus*** **Rohwer**

Euplectrus leucostomus Rohwer, 1921 :139, ♂. India, Coimbatore.

10. ***Euplectrus maternus*** **Bhatnagar**

Euplectrus maternus Bhatnagar,1952 : 173, ♀, ♂. India, Kanpur .

11. ***Euplectrus mathuri*** **Bhatnagar**

Euplectrus mathuri Bhatnagar, 1952 : 171, ♀, ♂. India, Dehra Dun

12. ***Euplectrus narariae*** **(Kurian), comb. nov.** [See Chapter 1]

13. ***Euplectrus nyctemerae*** **Crawford**

Euplectrus nyctemerae Crawford, 1914 : 463, ♀. India, Bangalore .

14. ***Euplectrus parvulus*** **Ferriere**

Euplectrus parvulus Ferriere, iv.1941 : 33, ♀, ♂. India : Allahabad, Dehra Dun, Chichawatni; Pakistan; Myanmar.

Euplectrus plecopterae Mani, vi.1941 : 31-32, ♂. India, Allahabad, also Dehra Dun; Pakistan.

15. ***Euplectrus petiolatus*** **Ferriere**

Euplectrus petiolatus Ferriere, 1941: 34, ♀, ♂. India, Dehra Dun .

16. ***Euplectrus spodopterae*** **Bhatnagar**

Euplectrus spodopterae Bhatnagar, 1952 : 169, ♀. India, Travancore, Pokam .

17. ***Euplectrus utetheisae*** **Mani & Kurian**

Euplectrus utetheisae Mani & Kurian, 1953 : 17- 19, ♀, ♂. India, Bangalore

X. Genus *Eurycephaloplectrus* Wijesekara & Schauff

1.***Eurycephaloplectrus natadae*** **(Kurian), comb. nov.** [See Chapter 1]

XI. Genus *Guptaiella* Khan & Sushil

1.***Guptaiella indica*** **Khan & Sushil**

Guptaiella indica Khan & Sushil, 1998: 2-4, ♀. India, Pantnagar.

XII. Genus *Hemiptarsenus* Westwood

1.***Hemiptarsenus indicus*** **Khan**

Hemiptarsenus indicus Khan,1985 : 153 – 154, ♀. India, Pantnagar.

2.***Hemiptarsenus varicornis*** **(Girault)** [See Chapter 1]

XIII. Genus *Manipurella* Narendran

1.***Manipurella moringae*** **Narendran**

Manipurella moringae Narendran, in Narendran *et al.*, 2003 : 24-26, ♀. India, Manipur, Trilbung.

XIV. Genus *Mohaniella* Khan

1.***Mohaniella indica*** **Khan**

Mohaniella indica Khan, 1995: 4 – 6, ♀. India, Mussoorie, Chakrauta.

XV. Genus *Necremnus* Thomson

1.***Necremnus leucarthros*** **(Nees)**

Necremnus leucarthros (Nees): Subba Rao, *et.al.*, 1967 : 370 – 379.

XVI. Genus *Notanisomorphella* Girault

1.*Notanisomorphella flaviventris* (Girault) [See Chapter 1]

XVII. Genus *Platyplectrus* Ferriere

1.*Platyplectrus kuriani* Wijesekara

Euplectromorpha natadae Kurian, 1954 : 122 – 123, ♂. India, Tatipaka.

[Preoccupied in *Platyplectrus* by *natadae* Ferriere, 1941].

Platyplectrus kuriani Wijesekara, in Wijesekara & Schauff, 1994: 34. Replacement name for *natadae* Kurian, not Ferriere.

2.*Platyplectrus viridiceps* (Ferriere)

Euplectromorpha viridiceps Ferriere, 1940: 136, ♀. Indonesia, Java. Also India, Dehra Dun.

Platyplectrus viridiceps (Ferriere) : Wijesekara & Schauff, 1994 : 33.

XVIII. Genus *Setelacher* Boucek

1.*Setelacher fasciatus* Boucek

Setelacher fasciatus Boucek, 1988: 651, ♀. Australia. Also from Pusa, India.

XIX. Genus *Stenomesius* Westwood

1.*Stenomesius anati* Khan & Singh

Stenomesius anati Khan & Singh, 1994: 11-15, ♀. India, Nainital, Jeolikot.

2.*Stenomesius japonicus* (Ashmead) [See Chapter 1]

3.*Stenomesius modicellus* Khan

Stenomesius modicellus Khan, 1994: 25 – 27, ♀. India, Tamil Nadu, Padappai.

4. *Stenomesius singularis* (Shafee & Rizvi) [See Chapter 1]

XX. Genus *Sympiesis* Foerster

1.*Sympiesis dolichogaster* Ashmead

Sympiesis dolichogaster Ashmead: Husain & Khan, 1986: 212 .

Asympiesiella india Girault, 1916: 341-342, ♀. India, Bihar, Pusa. Synonymy by Boucek, 1988: 621.

2.*Sympiesis hyblaeae* Surekha

Sympiesis hyblaeae Surekha, in Surekha *et al.*, 1996: 74, ♀ , ♂. India, Calicut.

XXI. Genus *Trichospilus* Ferriere

1.*Trichospilus diatraeae* Cherian & Margabandhu

Trichospilus diatraeae Cherian & Margabandhu, 1942: 101, ♀. India, Coimbatore. Boucek (1976) for distribution and hosts.

2.*Trichospilus pupivora* Ferriere

Trichospilus pupivora Ferriere, 1930: 358, ♀, ♂. India, Cochin.

Boucek (1976) for distribution and hosts.

REFERENCES

BATRA, R.C. & SANDHU, G.S. 1981. Differential population of citrus leaf-miner and its parasites on some commercial citrus cultivars. J. Res. Punjab Agric. Univ., 18: 170-176.

BHATNAGAR, S.P. 1952. Descriptions of new and records of known Chalcidoidea (parasitic Hymenoptera) from India. Indian J. Agric. Sci., 21: 155-178.

BOUCEK, Z. 1976a. Taxonomic studies on some Eulophidae (Hym.) of economic interest, mainly from Africa. Entomophaga, 21: 401-414.

BOUCEK, Z. 1976b. The African and Asiatic species of *Trichospilus* and *Cotterellia* (Hymenoptera, Eulophidae). Bull. Ent. Res., 65: 669-681.

BOUCEK, Z. 1988. *Australasian Chalcidoidea (Hymenoptera).* CAB Interna-tional, Wallingford, Oxon. 832 pp.

CHERIAN, M.C. & MARGABANDHU, V. 1942. A new species of *Trichospilus* (Hym: Chalcidoidea) from south India. Indian J. Ent., 4: 101-102.

CHISHTI, A. K. & SHAFEE, S. A. 1988. Species of the genera *Elachertus* Spinola and *Pediobius* Walker (Hymenoptera : Eulophidae) from India. Indian J. Syst. Ent., 5 : 19-23.

CRAWFORD, J. 1914. New Philippine Hymenoptera. Philippine J. Sci., 9: p.463.

FERRIERE, C. 1930. Notes on Asiatic Chalcidoidea. Bull. Ent. Res., 21: 353-360.

FERRIERE, C. 1940. On some parasites and hyperparasites of *Artona catoxantha* Hamp. Bull. Ent. Res., 31: 131-139.

FERRIERE, C. 1941. New species of Euplectrini (Hym: Chalcidoidea) from Europe, Africa and Asia. Bull. Ent. Res., 32: 17-48.

GIRAULT, A.A. 1913. Australian Hymenoptera Chalcidoidea – IV. Mem. Qd. Mus., 2: 140-296.

GIRAULT, A.A. 1916. Descriptions of and observations on some chalcidoid Hymenoptera –II. Canad. Ent., 48: 337-344.

HANSSON, C. & LASALLE, J. 1996. Two new eulophid parasitoids (Hymenoptera: Chalcidoidea: Eulophidae) of *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae). Oriental Ins., 30: 193-202.

HAYAT, M. & SHAHI, M. H. 2004. Taxonomic notes on Indian Eulophidae (Hymenoptera: Chalcidoidea) – 1. On the types of some Tetrastichinae. Oriental Ins., 38: 303-314.

HOWARD, L.O. & ASHMEAD, W.H. 1896. On some reared parasitic hymenopterous insects from Ceylon. Proc. U.S. Natl Mus., 18: 633-644.

HUSAIN, T. & KHAN, M. Y. 1986. Family Eulophidae (pp. 211-245) In: The Chalcidoidea (Insecta: Hymenoptera) of India and the adjacent countries. Part 2. (Eds. B. R. Subba Rao & M. Hayat). Oriental Ins., 20: 1- 430.

KHAN, M.A. 1985. Eulophid parasites (Hymenoptera: Eulophidae) of Agromyzidae in India. J. Bombay Nat. Hist. Soc., 82: 149-159.

KHAN, M.A. 1994. A new species of the genus *Stenomesius* Westwood (Hymenoptera: Eulophidae) from India. Boll. Lab. Ent. Agr. Filippo Silvestri, 49: 23-30.

KHAN, M.A. 1995. *Mohaniella indica* gen. Et sp. nov. (Hymenoptera : Eulophidae) described from India. Boll. Lab. Ent. Agr. Filippo Silvestri, 50: 3-7.

KHAN, M.A. & SINGH, R.S.J. 1994. A new species of *Stenomesius* Westwood (Hymenoptera: Eulophidae) from Nainital hilla. Shashpa, 1: 11-16.

KHAN, M.A. & SUSHIL, S.N. 1998. A new genus *Guptaiella* gen. n. of Eulophidae

(Hymenoptera: Chalcidoidea) from northern India. Shashpa, 5: 1-4.

KURIAN, C. 1954. Descriptions of some new chalcids (parasitic Hymenoptera) from India. Agra Univ. J. Res. (Sci.), 3: 119-134.

MANI, M.S. 1935. New Indian Chalcidoidea (parasitic Hymenoptera). Rec. Indian Mus., 37: 256-258.

MANI, M. S. 1941. Parasitic Hymenoptera from India. Indian J. Ent., 3: 25-36.

MANI, M. S. & KURIAN, C. 1953. Decsriptions and records of chalcids (parasitic Hymenoptera) from India. Indian J. Ent., 15: 1-22.

NARAYANAN, E.S., SUBBA RAO, B.R. & PATEL, G.A.A. 1957. A new pteromalid genus from India. Indian J. Ent., 19: 202-203.

NARENDRAN, T.C. 2004. Descriptions of a new subgenus and two new species of Eulophidae (Hymenoptera : Chalcidoidea) from India. Rec. Zool. Surv. India, 103: 129-135.

NARENDRAN, T.C. & SINU, P.A. 2003. A new genus and a new species of Eulophidae (Hymenoptera: Chalcidoidea) from India. Zoos' Print Journal, 18 : 1031-1033.

ROHWER, S.A. 1921. Descriptions of new chalcidoid flies from Coimbatore, south India. Ann. Mag. Nat. Hist., (9)7 : 123-135.

SARASWAT, G.G. & MUKERJEE, M.K. 1975. Records of some known and descriptions of some new species of chalcids (Hymenoptera) from India. Mem. School Ent. St.John's College Agra, No. 4: 35-62.

SCHAUFF, M.E., LASALLE, J. & COOTE, L.D. 1997. 'Chapter 10. Eulophidae' pp.327-429. In: G.A.P. Gibson, J.T. Huber and J.B. Woolley [eds]: *Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera).* NRC Research Press, Ottawa, Ontario, Canada. 794pp.

SHAFEE, S.A., FATMA, S., KHAN, M.Y. & SHUJAUDDIN. 1984. Two new species of Eulophidae (Hymenoptera: Chalcidoidea) from Andaman Islands. J. Bombay Nat. Hist. Soc., 80: 618-620.

SHAFEE, S.A. & RIZVI, S. 1988a. Species of the genus *Hemiptarsenus* Westwood (SHymenoptera: Eulophidae) from India. Indian J. Syst. Ent., 5 : 11-17.

SHAFEE, S.A. & RIZVI, S. 1988b. Descriptions of three new species of Eulophidae (Hymenoptera) from India. Indian J. Syst. Ent., 5 : 35-38.

SINGH, R.S.J. & KHAN, M.A. 1997. A new genus and a new species of Eulophinae (Hymenoptera: Eulophidae) from India. Shashpa, 4: 9-11.

SUBBA RAO, B.R. 1957. Some new species of Indian Eulophidae. Indian J. Ent., 19: 50-53.

SUBBA RAO, B.R., PARSHAD, B., RAM, A., SINGH, R.P. & SRIVASTAVA, M.L. 1967. Further notes on *Hypera postica* (Gyllenhal) and its natural enemies. Indian J. Ent., 29: 370-379.

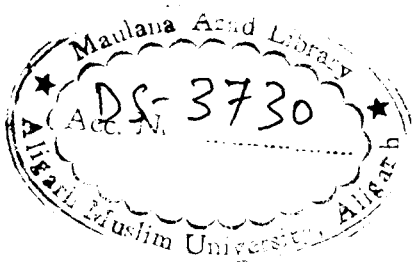
SUBBA RAO, B.R. & RAMAMANI, S. 1965. Biology of *Cirrospiloideus phyllocnistoides* (Narayanan) and description of a new species, *Scotolinx quadristriata* (Hymenoptera: Eulophidae) as parasites of *Phyllocnistis citrella* Stainton. Indian J. Ent., 27: 408-413.

SUBBA RAO, B.R. & SHARMA, ... 1966. ..... Indian J. Ent., 28 : 299

SUREKHA, K., LASALLE, J., SUDHEENDRAKUMAR, V.V. & MURTHY, S.J. 1996. A new species of *Sympiesis* (Hymenoptera: Eulophidae) parasitic on the teak defoliator *Hyblaea puera* (Lepidoptera: Hyblaeidae) in India. Bull. Ent. Res., 86: 73-76.

WIJESEKARA, G.A.W. & SCHAUFF, M.E. 1994. Revision of the tribe Euplectrini of Sri Lanka (Hymenoptera: Eulophidae). Oriental Ins., 28: 1-48.

WIJESEKARA, G.A.W. & SCHAUFF, M.E. 1997. Two new genera and three new species of Euplectrini (Hymenoptera: Eulophidae) from the new world. Proc. Ent. Soc. Washington, 99 : 101-109.

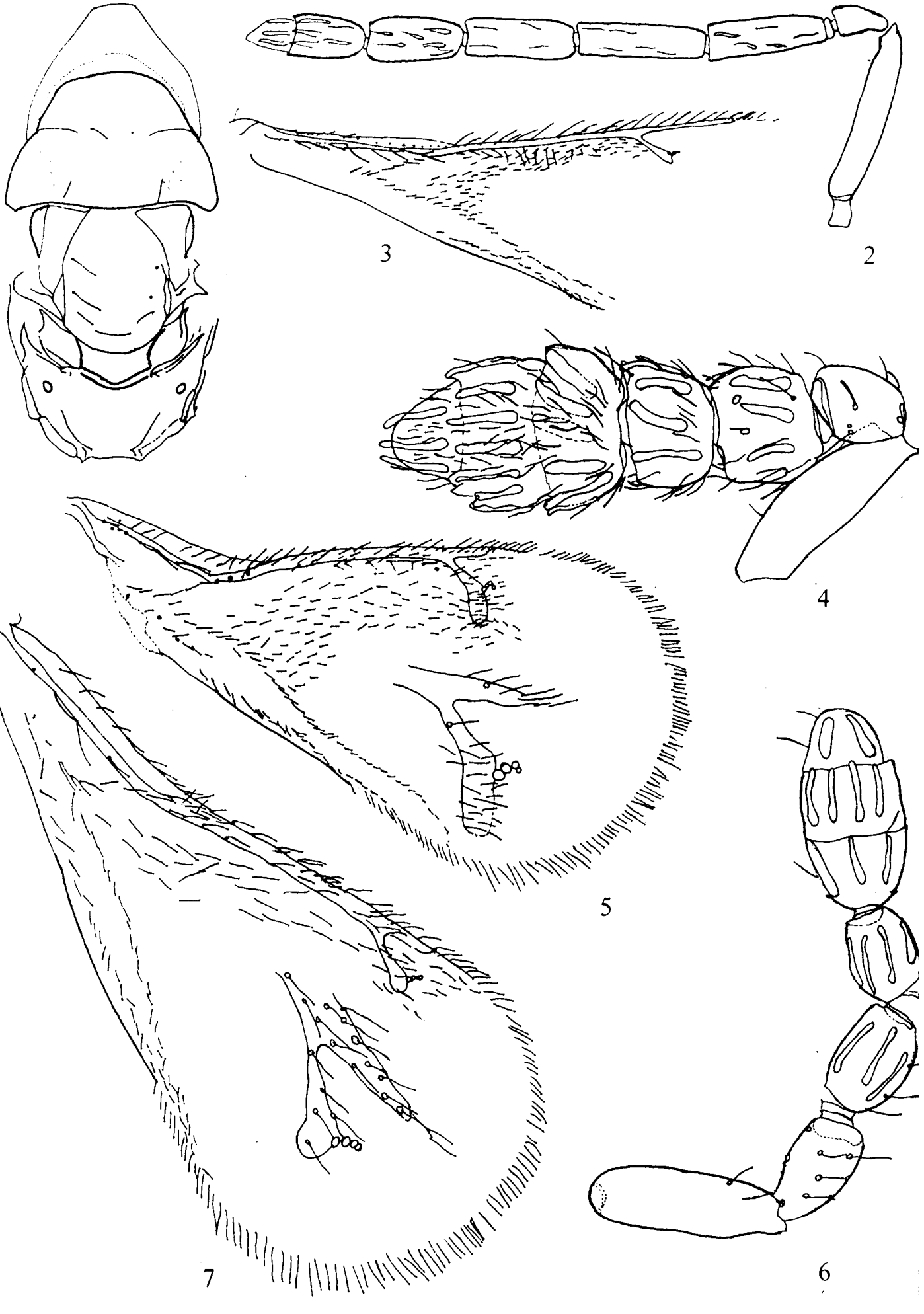


FIGURES 1-23

Figs. 1-7. (1-3) *Hemiptarsenus varicornis* (Girault), female: 1, thorax; 2, antenna; 3, part of fore wing.

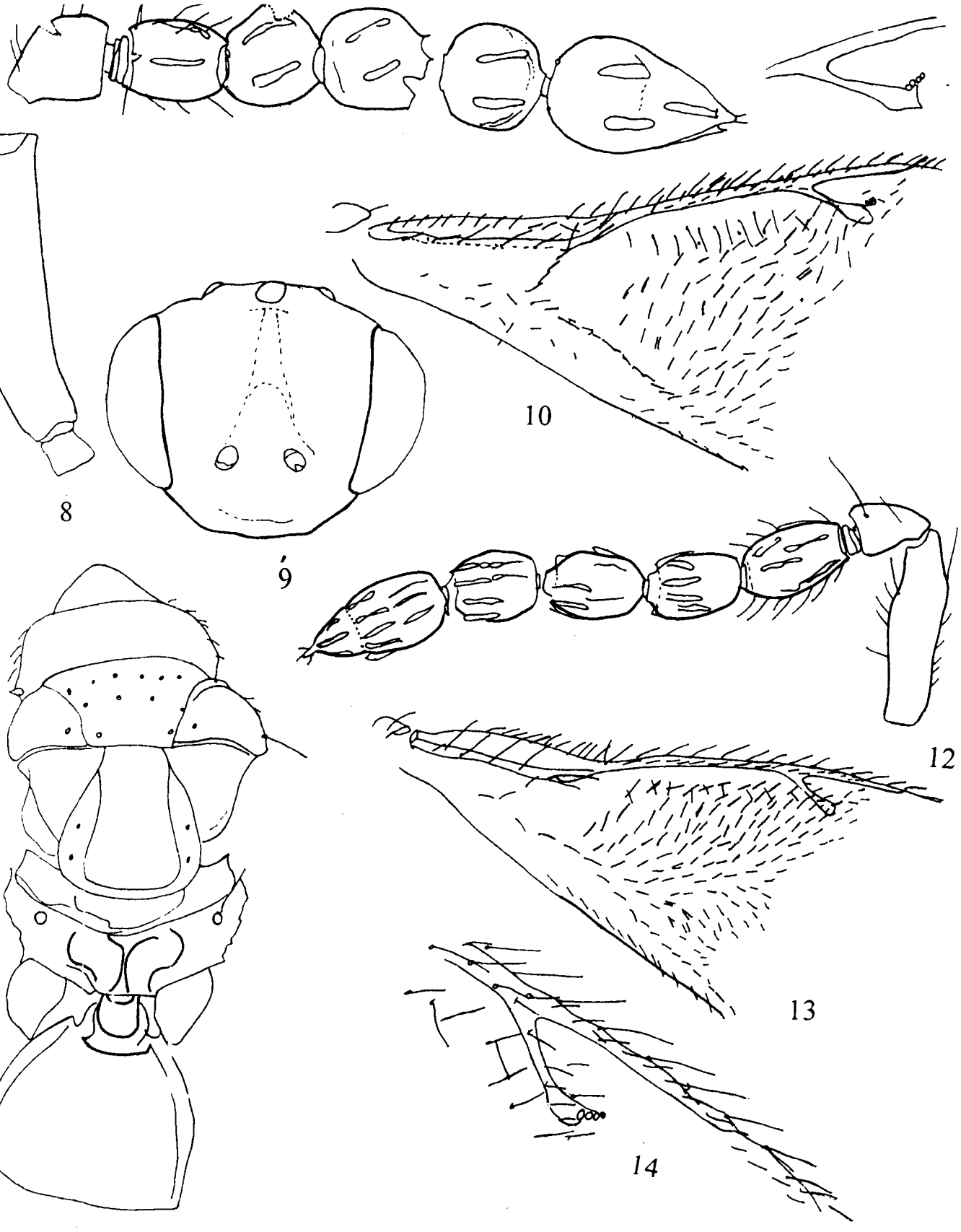
(4-5) *Cirrospilus brevicorpus* (Shafee and Rizvi); female: 4, antenna; 5, fore wing.

(6-7) *Cirrospilus kanpurensis* (Shafee & Rizvi), female: 6, antenna; 7, fore wing.


1
2
3
4
5
6
7

Figs. 8-14. (8-11) *Elachertus breviclavus* Chishti & Shafee; female: 8, antenna; 9, head; 10, part of fore wing; 11, thorax and TI of gaster.

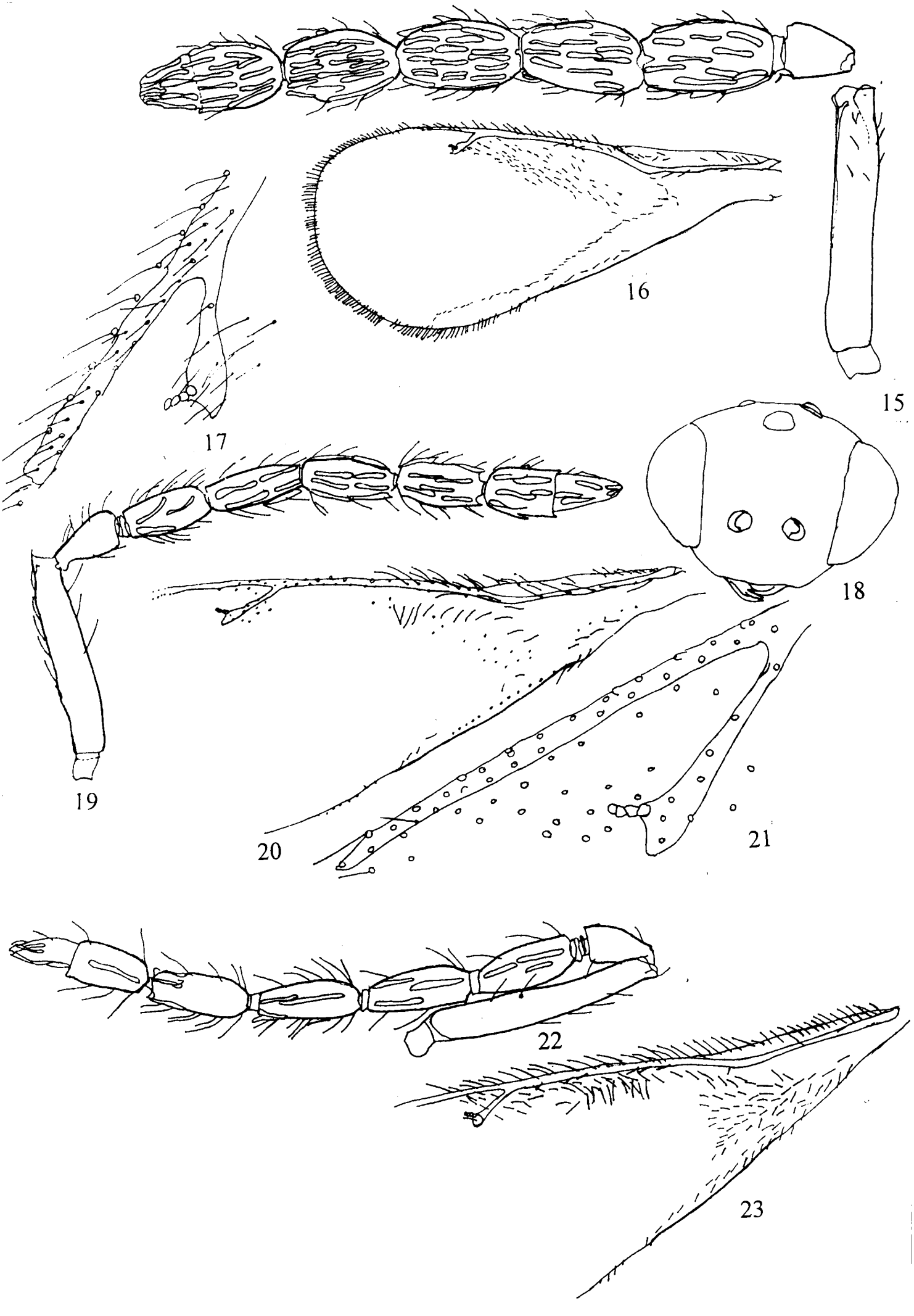
(12-14) *Euplectrus latifrons* Shafee, Fatima, Khan & Shujauddin; female: 12, antenna; 13, part of fore wing; 14, distal veins of fore wing.


8
9
10
11
12
13
14

Figs. 15-23. (15-17) *Notanisomorphella flaviventris* (Girault); female: 15, antenna; 16, fore wing; 17, distal veins enlarged.

(18-21) *Stenomesius japonicus* (Ashmead); female: 18, head; 19, antenna; 20, part of fore wing; 21,distal veinsenlarged.

(22-23) *Stenomesius singularis* (Shafee & Rizvi); female: 22, antenna; 23, part of fore wing.


16
15
17
18
19
20
21
22
23